

(12) **United States Patent**  
**Haahr et al.**

(10) **Patent No.:** **US 9,552,388 B2**  
(45) **Date of Patent:** **\*Jan. 24, 2017**

(54) **SYSTEM AND METHOD FOR PROVIDING SEARCH QUERY REFINEMENTS**

(71) Applicant: **Google Inc.**, Mountain View, CA (US)

(72) Inventors: **Paul Haahr**, San Francisco, CA (US);  
**Steven D. Baker**, Palo Alto, CA (US)

(73) Assignee: **Google Inc.**, Mountain View, CA (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 230 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/169,879**

(22) Filed: **Jan. 31, 2014**

(65) **Prior Publication Data**

US 2014/0149415 A1 May 29, 2014

**Related U.S. Application Data**

(63) Continuation of application No. 13/289,348, filed on Nov. 4, 2011, now Pat. No. 8,645,407, which is a (Continued)

(51) **Int. Cl.**  
**G06F 17/30** (2006.01)

(52) **U.S. Cl.**  
CPC ..... **G06F 17/30389** (2013.01); **G06F 17/3071** (2013.01); **G06F 17/30598** (2013.01); (Continued)

(58) **Field of Classification Search**  
CPC ..... G06F 17/30864; G06F 17/30389; G06F 17/30598; G06F 17/30696; G06F 17/30867; G06F 17/30646; G06F 17/30654

(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,056,021 A 10/1991 Ausborn  
5,488,725 A 1/1996 Turtle  
(Continued)

FOREIGN PATENT DOCUMENTS

JP 2000227922 A 8/2000  
JP 2001202390 A 7/2001  
JP 2002324077 A 11/2002

OTHER PUBLICATIONS

F. Scholer, H. E. Williams, "Query Association for Effective Retrieval," School of Computer Science and Information Technology, RMIT University, Melbourne, Australia, 2002, 8 pages.

(Continued)

*Primary Examiner* — Monica Pyo

(74) *Attorney, Agent, or Firm* — Fish & Richardson P.C.

(57) **ABSTRACT**

A system and method for providing search query refinements are presented. A stored query and a stored document are associated as a logical pairing. A weight is assigned to the logical pairing. The search query is issued and a set of search documents is produced. At least one search document is matched to at least one stored document. The stored query and the assigned weight associated with the matching at least one stored document are retrieved. At least one cluster is formed based on the stored query and the assigned weight associated with the matching at least one stored document. The stored query associated with the matching at least one stored document are scored for the at least one cluster relative to at least one other cluster. At least one such scored search query is suggested as a set of query refinements.

**20 Claims, 11 Drawing Sheets**

